

# CENTRAL VENOUS ACCESS CATHETERS

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## Objectives

- ▣ What are Central Venous Access Catheters (CVAC)
- ▣ Who will have a Central Venous Access Catheter
- ▣ Types of Central Venous Access Catheters
- ▣ Accessing the Central Venous Access Catheters
- ▣ Complications with Central Venous Access Catheters

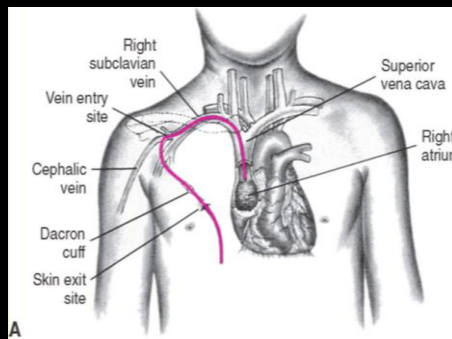
## What is a CVAC?



<http://www.med.unsw.edu.au/SPHCMWeb.nsf/pageprintfriendly/ResStrengthInfectious?opendocument>

## What is a CVAC?

- ▣ A tube is inserted directly into a central vein with the distal tip placed just above the right atria.
- ▣ Common veins include but are not limited to:
  - External Jugular
  - Subclavian
    - ▣ Very popular due to decreased risk of infection
  - Brachial
  - Femoral
    - ▣ Has a higher risk of infection



**Figure 42-20 A, Central venous catheter insertion and exit site.**  
(Aehlert, Barbara. *Paramedic Practice Today: Above and Beyond*. Mosby, 022009.).

## Who might have a CVAC?

- ▣ A CVAC can minimize painful peripheral IV attempts, so patients requiring frequent IV access may be candidates.
- ▣ Other reasons for insertion of a CVAC are:
  - Patient has poor peripheral venous access.
  - Patient requires medications that are given routinely or that irritate peripheral veins.
  - Patient requires rapid fluid or medication administration.

**Patients to suspect of having a CVAC include, but are not limited to ...**

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- ▣ Dialysis patients

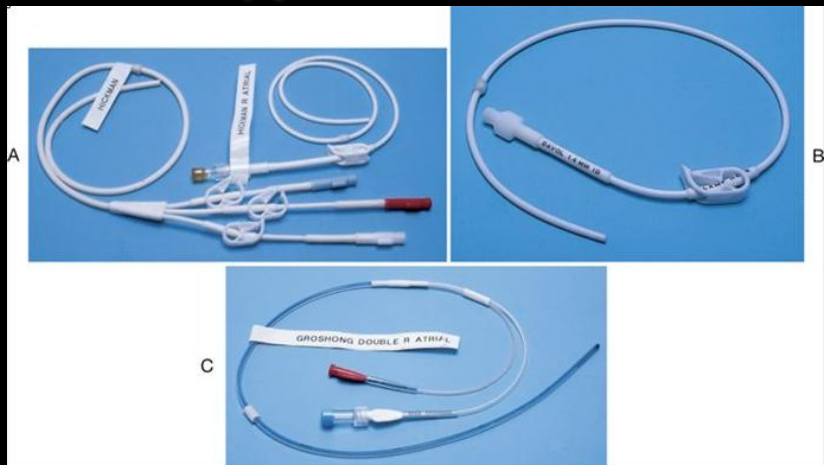
## **Patients to suspect of having a CVAC include, but are not limited to ...**

- ▣ Cancer patients
- ▣ Special needs patients
- ▣ Dialysis patients
- ▣ Critical care patients being transferred from one facility to another

## Types of CVAC

- ▣ Tunneled catheters are the most common. They are tunneled under the skin into a central vein.
  - Hickman®, Broviac®, or Groshong® catheters
  - May have one, two, or most commonly three lumens
  - Lumens may be used for fluids and meds, drawing blood, invasive monitoring, or nutritional support
  - These will typically exit the chest making them easy to miss if a physical inspection is not performed

## Types of CVAC

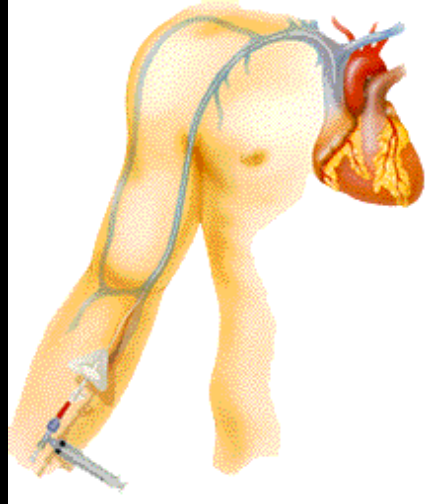


**FIGURE 21-3** A, Hickman catheter. B, Broviac catheter. C, Groshong catheter. (From Clayton BD, Stock YN: *Basic pharmacology for nurses*, ed 13, St Louis, 2004, Mosby. Courtesy Chuck Dresner.)

(Ogden, Sheila J.. *Calculation of Drug Dosages*, 8th Edition. C.V. Mosby, 032007.).

## Types of CVAC, cont.

- ▣ PICC (peripheral inserted central catheter) lines are inserted through a peripheral vein such as the antecubital fossa rather than the chest or neck, but the distal tip is still placed just above the right atria.



<http://terisblip.com/2010/10/18/mn-picc-thanks-force-blog-lag-good-night/>

## Types of CVAC, cont.

- ▣ Implanted ports, also known as a port-a-cath, are similar to tunneled catheters but do not exit the skin.
  - Small reservoir implanted under the skin in the upper anterior chest
  - Greatly reduce the risk of complication
  - Can be very easy to miss on physical inspection.

## Types of CVAC, cont.



**FIGURE 21-5 Silicone venous catheters with infusion ports.** (From Clayton BD, Stock YN: *Basic pharmacology for nurses*, ed 13, St Louis, 2004, Mosby. Courtesy Chuck Dresner.)  
(Ogden, Sheila J.. *Calculation of Drug Dosages*, 8th Edition. C.V. Mosby, 032007.)

## Accessing a CVAC

- ▣ Gather the equipment.
  - 12 cc syringe or preferably a 20 cc syringe.
  - Multiple syringes if you are going to draw blood.
  - Providone – iodine or alcohol swabs.
  - Huber needles for implanted devices.
- ▣ The most important thing to remember is to use aseptic techniques. Central lines are susceptible to infections which can be fatal.
  - Ensure proper BSI precautions.
    - ▣ Gloves, eye protection, and mask
  - If possible, wash hands prior to accessing the CVAC.
  - Providone - iodine should be used when possible.



## Accessing a PICC line

- ▣ To access a PICC catheter:
  - BSI!!!
  - Swap with providone – iodine or alcohol wipes.
  - Without touching the end of the catheter, attach syringe to cap or insert the needle.
  - Unlock the clamp.
  - Gently aspirate at least 10 mL of blood.
  - Gently flush the line with 10 mL of NaCl.
    - ▣ If line does not flush with ease, do not use.
  - If line flushed without problem, you may begin the infusion.

## Accessing a Tunneled Catheter

- ▣ Accessing a Hickman®, or Broviac® catheter is essentially the same procedure as accessing a PICC line with a couple of points to remember:
  - Typically these catheters are flushed with heparin, so be sure to aspirate at least 10 mL of blood.
  - Remember to close the clamps when not aspirating or flushing the catheter due to lack of anti-reflux valves.

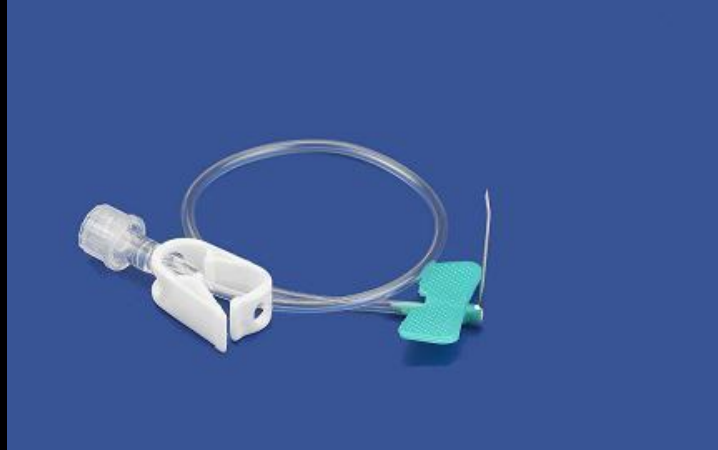
## Accessing an implanted device

- ▣ The process for accessing an implanted device will differ slightly.
  - BSI!!!
  - If possible, wash your hands and utilize sterile gloves.
    - ▣ Do not delay access in critical situations. If you can not use sterile procedures, utilize clean gloves.
  - Swab the skin with providone – iodine or alcohol.
  - Access the port using a Huber needle. Stabilize the port with your thumb and index finger. Inserting the needle at a 90 degree to the skin until it stops.
    - ▣ You may need to pull the needles back slightly if unable to aspirate blood.

## Accessing an implanted device, cont.

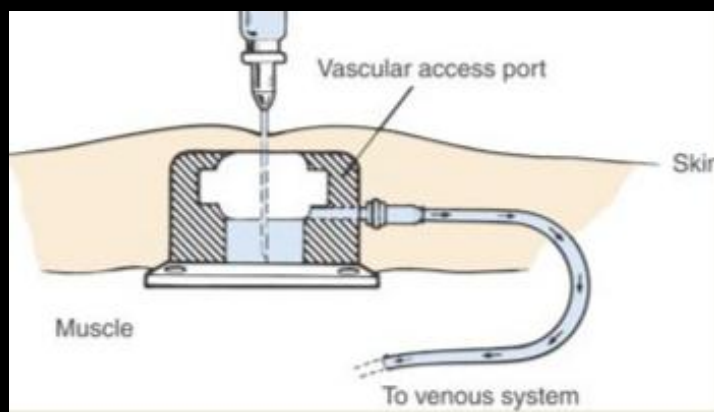
- ▣ Once inserted, place sterile gauze under the wings of the needle and secure using an occlusive dressing or tape.
- ▣ Since these ports are often heparinized, it is extremely important to aspirate 10 mL of blood prior to flushing or administering a bolus.
- ▣ Obtain blood samples if needed and your ready to flush and administer fluids and/or medication.
  - Be sure to clamp any tubing when not in use.

## Accessing an implanted device, cont.



<http://zhaoshimedical.en.buysytrade.com/products/info/1208769/Winged-Huber-Needle.html>

## Accessing an implanted device, cont.



**FIGURE 21-4** Example of an implantable vascular access device. (From Potter PA, Perry AG: *Fundamentals of nursing*, ed 6, St Louis, 2005, Mosby.)  
(Ogden, Sheila J.. *Calculation of Drug Dosages*, 8th Edition. C.V. Mosby, 032007.).

## Complications with CVAC

- ▣ Central catheters are relatively safe for paramedics to access in the clinical setting or in pre-hospital setting, but complications may occur. Proper training and remaining calm will help you troubleshoot the problem and determine a solution.
- ▣ Prevent the complication.
- ▣ Some complications may be fatal!!!

## Complications with CVAC, cont.

- ▣ Infections
  - Infections are not always preventable, but using sterile or clean techniques can help avoid contamination.
  - Wash hands if possible.
  - Always use BSI precautions.
  - Clean the port using aseptic techniques any time you access for blood draws, meds, or fluid administration

## Complications with CVAC, cont.



<http://blog.timesunion.com/mdtobe/category/legal-issues/>

## Complications with CVAC, cont.

- ▣ Poor flow
  - The CVAC may have poor flow. One possible cause could be that the line is positional. Try having the patient turn their head to one side and/or take a deep breath.
- ▣ Poor flow could indicate a more serious complication such as microthrombi.
  - Important to aspirate 10 mL prior to flushing or infusing meds to prevent flushing micro clots into the vasculature.

## Complications with CVAC, cont.

- ▣ Bleeding around tube can be common and is typically not life threatening if addressed early.
  - This can indicate catheter dislodgment.
  - Try to avoid dislodgment by not letting the tube get snagged on bed rails or other objects.
  - Treatment in the field is bleeding control.

## Summary

- ▣ EMS provider may encounter one of many types of central venous access catheters in a clinical or pre-hospital setting.
- ▣ Familiarize your self with these devices and the patients who may have them, and be prepared to access them in an emergency situation.
- ▣ Proper training and practice will increase the chance of proper use and minimize the chance of potentially life threatening complications.
  - Google, YouTube, ect.

## References

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